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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
MCNELIS, KATHLEEN A	

ART UNIT	PAPER NUMBER
1742	

DATE MAILED: 03/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/537,861	ITO ET AL.	
	Examiner	Art Unit	
	Kathleen A. McNelis	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *Aug 10,2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claims Status

Claims 1-6 remain for examination wherein claims 1, 4 and 5 are amended and claim 6 is new.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (U.S. Pat. No. 6,251,156).

Hofmann et al. discloses a method for producing a high-purity, high-carbon molten iron product where the carbon content is from about 1.0% to 5.0% (col. 7 lines 59-64). The range of between 1.0 and 5.0% overlaps the claimed range of 3.0 mass % or more. It would have been obvious for one of ordinary skill in the art at the time the invention was made to produce iron with carbon content of between 3.0 and 5.0 mass%, since Hoffman et al. teaches that the entire range between 1.0 and 5.0% can be produced by this method.

Hoffman et al. discloses a method for producing a high purity molten iron of at least 95% reduced iron (col. 10 lines 1-3). The range of at least 95% is within the claimed rate of a metallization ratio of 80% or more. Hoffman et al. teaches that calcium and magnesium oxides are added in specific tailored compositions to influence the desulfurization of the bath, and provides ranges for acceptable C/S and V ratios of between 0.5 and 2.2 and between 0.4 and 1.4 respectively (col. 4 lines 32-60). Both C/S and V are measures of slag basicity. The ranges of between 0.5 and 2.2 and 0.4 and 1.4 overlap the claimed range of 1.1 or more. It would have been obvious to one of ordinary skill in the art at the time the invention was made to tailor the feed composition to achieve a C/S ratio of between 1.1 and 2.2 and/or a V ratio of between 1.1 and 1.4,

since Hoffman et al. teaches that any C/S ratio of between 0.5 and 2.2 or V ratio of between 0.4 and 1.4 are useful for desulphurization of the bath.

Hoffman et al. does not disclose that the CaO is added at a rate of 40 kg or less per ton of molten iron (instant claim 1) or that 6 mass% or more of MgO is added (instant claim 6). Hoffman teaches that the CaO and MgO additives are tailored to a specific composition that then influences the desulphurization of the bath (col. 4 lines 32-60). The CaO and MgO concentrations are therefore recognized as result-effective variables in the art, which are varied to affect the desulphurization of the melt. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the CaO and MgO as result-effective variables to affect the desulfurization of the melt (see M.P.E.P 2144.05, II, B).

Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (U.S. Pat. No. 6,251,156) as applied to claim 1 and further in view of Hoffman et al. (U.S. Pat. No. 6,648,942).

Hoffman et al. '156 discloses a method for producing molten iron of between 1 and 5% carbon and iron metallization of at least 95% or more by reducing iron oxides agglomerated with carbon CaO and MgO as described above regarding claim 1. Further, Hoffman et al. '156 discloses that sufficient carbon is added to reduce the FeO and other oxide species as well as provide as much excess as required by the process (col. 5 lines 3-20).

Hoffman et al. '156 does not disclose that carbon is fed onto the hearth (claim 2), or that the amount is 30 kg carbon or more per ton of molten iron (claim 3).

Hoffman et al. '942 discloses a method for producing high quality reduced iron by reducing iron oxide in a moving finisher hearth melter with high process control and thermal efficiency (col. 2 line 51-col. 3 line 7). Prior to charging the iron, the hearth is conditioned by placing a layer of carbonaceous materials such as graphite, anthracite coal or coke onto the hearth. The conditioning materials may also include magnesia and CaO. The hearth conditioner acts as a source of solid carbon that diffuses into the metallic iron to lower the effective melting point and promote formation of nuggets and is a protective layer that supports the iron nuggets on the hearth (col. 3 lines 8-20). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a hearth conditioning layer to provide a source of solid carbon as taught by Hoffman et al. '942 to protect the hearth of Hoffman et al. '156 and act as a source of solid carbon as taught by Hoffman et al. '942. Further, while Hoffman et al. '156 in view of Hoffman et al. '942 does not specifically teach adding at least 30 kg or more of carbonaceous material per ton of molten iron, Hofmann et al. '942 teaches that the carbon provides protection of the hearth from nascent slag, preventing penetration into the refractory (col. 3 lines 8-40), therefore the quantity of carbon added is a result effective variable depending on the quantity of slag generated (see M.P.E.P. 2144.05, II, B).

With respect to claims 4 and 5, sufficient CaO is added to adjust the basicity to 1.1 or more and sufficient carbon is added to reduce iron and other oxides and provide required excess as described above regarding claim 1.

Claims 1 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (U.S. PG. Pub. 2001/0054329).

Hoffman et al. discloses a method for producing a molten iron having a carbon content of 1 to 5% (¶ 0013) by feeding input materials containing a carbonaceous reducing agent, iron oxides and CaO onto a hearth of a moving-hearth reducing furnace and heating the materials in this furnace to reduce the iron oxide to a metallization ratio of 80% or more. The solid reduced iron is fed at high temperature (700 °C) into a melting furnace (electric melter) and further heated (¶ 0022 and Table (I)). The range of between 1 and 5% carbon overlaps with the claimed range of 3 mass % or more. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the carbon content to between 3 and 5% by mass in the liquid iron since Hoffman et al. teaches that any iron content between 1 and 5% has equal utility.

Hoffman et al. teaches that calcium and magnesium oxides are added in specific tailored compositions to influence the desulfurization of the bath, and provides ranges for acceptable C/S and V ratios of between 0.5 and 2.2 and between 0.4 and 1.4 respectively (¶ 0024 and Table 2). Both C/S and V are measures of slag basicity. The ranges of between 0.5 and 2.2 and 0.4 and 1.4 overlap the claimed range of 1.1 or more. It would have been obvious to one of ordinary skill in the art at the time the invention was made to tailor the feed composition to achieve a C/S ratio of between 1.1 and 2.2 and/or a V ratio of between 1.1 and 1.4, since Hoffman et al. teaches that any C/S ratio of between 0.5 and 2.2 or V ratio of between 0.4 and 1.4 are useful for desulphurization of the bath.

Hoffman et al. does not disclose that the CaO is added at a rate of 40 kg or less per ton of molten iron (claim 1) or that 6 mass% or more of MgO is added. Hoffman teaches that the CaO and MgO additives are tailored to a specific composition based on the sulfur content of the bath (¶ 0035). The CaO and MgO concentrations are therefore recognized as result-effective variables in the art, which are varied to affect the desulphurization of the melt. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the CaO and MgO as result-effective variables to affect the desulfurization of the melt (see M.P.E.P 2144.05, II, B).

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (U.S. P.G. Pub. 2001/0027701).

Ito et al. ('701) discloses a method for producing granular metallic iron by heating iron oxide and carbonaceous reductant in an reduction melting furnace, thereby reducing iron to not less than 80% reduction with a residual carbon content of not less than 3.5% and charging this iron into a steelmaking furnace wherein molten steel is produced. Calcium oxide is blended with the iron ore and carbonaceous reducing agent to the hearth of a moving hearth type reduction melting furnace in a quantity to adjust the slag basicity in the range of between 0.6 and 1.8 (p. 19 claims 1, 4, 5, 7 and 8). The range of not less than 3.5% is within the claimed range of 3.0% or more. The range of not less than 80% reduction is the same as the claimed range of a metallization ratio of 80% or more. The range of 0.6 to 1.8 overlaps the claimed range of 1.1 or more. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the slag basicity to between 1.1 and 1.8, since Ito et al. '701 teaches

that any value between 0.6 and 1.8 has equal utility for lowering the sulfur content (claim 4). Ito et al. ('701) teaches that the quantity of calcium oxide added is determined based on achieving a slag basicity of between 0.6 and 1.8, and is preferably within the range of between 3.0 and 5.0% based on the total amount of formed raw material (paragraph 0118). The range of between 3.0 and 5.0 % overlaps with the claimed range of 40 kg or less per ton (i.e. less than or equal to 4 wt %). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add between 3.0 and 4.0 wt % calcium oxide, since Ito et al. ('701) discloses that the entire range between 3.0 and 5.0 is preferred for maintaining a slag basicity within the desired range.

With respect to claim 2, Ito et al. '701 discloses in claim 2 that a carbonaceous material is charged onto the hearth before the formed raw material (disccused above regarding instant claim 1). Ito et al. '701 discloses that first a powder of carbonaceous material is spread on the hearth, then pellets are charged (paragraphs 0201 and 0202).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1 and 2 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-3 and 7 of U.S. Patent No. 6,630,010 (Ito et al. '010).

Although the conflicting claims are not identical, they are not patentably distinct from each other because:

With respect to instant claim 1:

- Ito et al. '010 claim 1 discloses a method of heating a formed raw material in a reducing melting furnace wherein the raw material contains iron oxide, carburizing reducing agent and calcium oxide. The calcium oxide present in sufficient quantity to form a slag within a basicity value of between 0.6 and 1.8. The range of between 0.6 and 1.8 overlaps the claimed range of 1.1 or more. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust slag basicity to the range of between 1.1 and 1.8 since Ito et al. '010 teaches that any value between 0.6 and 1.8 has equal utility. While Ito et al. '010 does not disclose that calcium oxide is fed in an amount of 40 kg or less per ton of molten iron, Ito et al. '010 expresses the basicity as a ratio of CaO to SiO_2, and teaches that CaO is added to achieve a basicity value in the range of between 0.6 and 1.8. The quantity of CaO added is therefore a result effective variable which affects the basicity of the slag. It would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the quantity of calcium oxide added as result-effective variables to affect the slag basicity (see M.P.E.P 2144.05, II, B);

- In claim 7, Ito et al. '010 discloses that the iron is metallized to not less than 80% and the carbon content is not less than 3.5%. The range of not less than 3.5% is within the claimed range of 3.0% or more. The range of not less than 80% reduction is the same as the claimed range of a metallization ratio of 80% or more.

With respect to instant claim 2, Ito et al. '010 discloses in claim 2 that a carbonaceous material is charged onto the hearth before the formed raw material (discussed above regarding instant claim 1) and in claim 3 that the particle size is 3 mm or less. Particles having a diameter of 3 mm or less are "powdery" as in instant claim 2.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen A. McNelis whose telephone number is 571-272-3554. The examiner can normally be reached on M-F 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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